

Amendments to the Specification:

On page 1, line 2, after the Title; please insert the following headings and paragraphs:

CROSS-REFERENCE TO RELATED APPLICATION

5 This application is a national phase filing, under 35 U.S.C. §371(c), of International Application No. PCT/DK2005/000148, filed March 4, 2005, the disclosure of which is incorporated herein by reference in its entirety.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

10 Not Applicable

BACKGROUND OF THE INVENTION

15 Please replace the paragraph beginning at page 1, line 9 with the following rewritten paragraph:

A number of structural or building systems exists such as house buildings, including horizontal divisions, doors, windows, fire shieldings, structures of ships, including deck divisions, divisions between shutters, doors, windows and fire shieldings, etc. which serve the purpose of physically separating the one side of the structural element or elements from the opposite side and for preventing [[that]] a fire, provided that a fire should occur on the one side of the structural element or elements, be transmitted to the other side of the element or elements. Conventionally, structural elements of this kind are built from steel or include a steel component which is fixated to a supporting structure or another structural element by means of a high temperature resistant and thermal insulating elements such as a high temperature resistant pultruded body, i. e. a body made from a high temperature resistant resin and including high strength and high stiffness ~~fibres~~ fibers such as glass ~~fibres~~ fibers, ~~fibres~~ fibers, ~~Kevlar~~ KEVLAR ~~fibres~~ fibers, etc. The high temperature resistant body made from e. g. epoxy, phenol, fire retarded polyester resin and including glass ~~fibres~~ fibers may stand exposure to temperatures above 1000° C and have been used extensively within the field of fire-resistant structures, such as fire-resistant doors and the like. Examples of fire-resistant doors per se are described in US 6, 434, 899, US 6, 615, 544, US 4, 811 538, US 4, 364, 987 and

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The above object, the above advantage together with numerous other objects, advantages and features which will be evident from the below detailed description of the present invention are according to a first aspect of the present invention obtained by a method of preventing or reducing temperature gradient caused bending of a structural element made of a material capable of withstanding heating to a specific temperature for an extended period of time, when heating the element to the specific temperature, the structural element being connected to an adjacent supporting structural element through a high temperature resistant supporting body, comprising the steps of providing the structural element, providing the high temperature resistant supporting body as a pultruded profiled body including a solidified high temperature resistant resin and reinforcing ~~fibres~~ fibers at least a part of which being constituted by ~~fibres~~ fibers exhibiting high strength and high stiffness at a low temperature and a reduced strength and reduced stiffness when exposed to and possibly deteriorated at the specific temperature and fixating the structural element relative to its supporting structure by means of the pultruded body.

Please replace the paragraph beginning at page 4, line 12 with the following rewritten paragraph:

According to the basic teachings of the present invention, the structural supporting high temperature resistant pultruded body includes a part of ~~fibres~~ fibers which are not stable at the specific temperature and which are softened or alternatively deteriorated at the specific temperature thereby weakening the supporting pultruded body.

Please replace the paragraph beginning at page 4, line 18 with the following rewritten paragraph:

The reinforcing ~~fibres~~ fibers may specifically comprise a first part constituted by high strength, high stiffness and high temperature stable ~~fibres~~ fibers such as glass ~~fibres~~ fibers, carbon ~~fibres~~ fibers, Kevlar KEVLAR ~~fibres~~ fibers capable of withstanding heating to the specific high temperature and a second part such as polymer ~~fibres~~ fibers, natural ~~fibres~~ fibers, e. g. polymer ~~fibres~~ fibers made from PE, PP, PVC or similar materials or combinations thereof, or alternatively natural ~~fibres~~ fibers such as ~~fibres~~ fibers made from plants, trees, etc. or ~~fibres~~ fibers made from glass, carbon ~~fibres~~ fibers or similar high strength and high stiffness ~~fibres~~ fibers provided with an outer polymer coating such a PE, PP or PVC coating.

Please replace the paragraph beginning at page 4, line 27 with the following rewritten paragraph:

The ~~fibres~~ fibers causing the weakening of the supporting pultruded body, i. e. the above- mentioned second part of the ~~fibres~~ fibers, may be evenly distributed within the resin or alternatively be located at specific zones for establishing a specific weakening zone or a bending zone rather than providing an overall weakening of the supporting pultruded body. The location of the ~~fibres~~ fibers which cause the weakening of the supported body when exposed to the elevated high temperature may further be symmetrical or asymmetrical within the pultruded body as an asymmetrical location may cause one side of the pultruded body to be weakened and thereby causing a one side deformation of the body rather than an overall weakening and a deformation of the pultruded body when exposed to the specific elevated temperature. Provided that one or more zones ~~[[be]]~~ are located within the pultruded supporting body, a central deformation or a central deformation zone may be obtained, provided that the zones ~~[[be]]~~ located at the ~~centre~~ center of the pultruded body.

Please replace the paragraph beginning at page 5, line 23 with the following rewritten paragraph:

The above object, the above advantage together with numerous other objects, advantages and features which will be evident from the below detailed description of the present invention are according to a second aspect of the present invention obtained by a pultruded body comprising a resin body including a solidified high temperature resistant resin and reinforcing ~~fibres~~ fibers at least a part of which being constituted by ~~fibres~~ fibers exhibiting high strength and high stiffness at a low temperature and a reduced strength and a reduced stiffness when exposed to and possibly deteriorated at said specific temperature.

Please replace the paragraph beginning at page 6, line 5 with the following rewritten paragraph:

Finally, according to a third aspect of the present invention, a method of producing a pultruded body according to the above second aspect of the present invention is provided which method comprises the steps of providing reinforcing ~~fibres~~ fibers at least a part of which being constituted by ~~fibres~~ fibers exhibiting high strength and high stiffness at a low temperature and a reduced strength and reduced stiffness when exposed to and possibly de-

riorated at the specific temperature, providing a resin and producing the body from the reinforcing ~~fibres~~ fibers and the resin in a ~~pulltrusion~~ pultrusion process for providing the pultruded body and curing the pultruded body at a temperature without deteriorating the at least part of the ~~fibres~~ fibers.

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Please replace the paragraph beginning at page 6, line 15 with the following rewritten paragraph:

Basically, the method of producing the pultruded body according to the second aspect of the present invention and in itself constituting a third aspect of the present invention basically constitutes a conventional pultrusion technique involving the positioning of the ~~fibres~~ fibers characteristic of the present invention exhibiting the feature of providing a high strength, high stiffness and high stable pultruded body at tow temperatures such as temperatures below 100° C and allowing the pultruded fire- resistant body to be bent or otherwise deformed or eliminating or substantial reducing the temperature gradient caused bending by the simple melting of the ~~fibres~~ fibers provided polymer ~~fibres~~ fibers be used or alternatively through deterioration such as through burning or decomposition provided certain polymer ~~fibres~~ fibers or natural ~~fibres~~ fibers be used.

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On page 6, after line 25, please insert the following heading:

#### BRIEF DESCRIPTION OF THE DRAWINGS

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Please replace the paragraph beginning at page 7, line 14 with the following rewritten paragraph:

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Fig. 6 is a diagrammatic view illustrating the effect of substituting high strength and high stiffness ~~fibres~~ fibers of a pultruded body for allowing the pultruded body to be extended when exposed to heat, and

On page 7, after line 17, please insert the following heading:

#### DETAILED DESCRIPTION OF THE INVENTION

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Please replace the paragraph beginning at page 8, line 7 with the following rewritten paragraph:



For preventing the temperature gradient caused bending of the structural element 10, the thermal insulating and structural supporting elements of the structural element according to the teachings of the present invention provided with certain zones which are weakened when exposed to the extreme heating such as a heating to a temperature of 800°-1000° C. In a conventional fire-resistant structural element, e. g. a door or a wall, the two metallic faces constituting the side walls of the fire-resistant structural element are interconnected by a non-thermal transmitting or heat insulating pultruded body serving to reduce the thermal transmission of heat from the hot side to the cold side. As a conventional high strength, high stiffness and high temperature resistant pultruded body includes solid glass ~~fibres~~ fibers, carbon ~~fibres~~ fibers or Kevlar-KEVLAR ~~fibres~~ fibers, the pultruded body maintains its high strength and high stiffness even at the extreme temperatures to which the body may be exposed when included in a fire-resistant the structural element which is exposed to fire at the one side such as a heating to a temperature of 800°-1000° C. In order to allow the two metallic leaves or walls of the structural element to be shifted relative to one another and consequently eliminating or to a substantial extent reducing the temperature gradient caused bending of the fire-resistant structural element, the thermal insulating and supporting pultruded body of the fire-resistant wall is according to the teachings of the present invention constituted by a pultruded, profiled body which includes apart from the high strength, high stiffness and high thermal stable glass ~~fibres~~ fibers, carbon or Kevlar-KEVLAR ~~fibres~~ fibers, ~~fibres~~ fibers such as polymer ~~fibres~~ fibers and natural ~~fibres~~ fibers which are melted or deteriorated when exposed to the extreme high temperature of e. g. 800°-1000° C.

Please replace the paragraph beginning at page 8, line 31 with the following rewritten paragraph:

Throughout the various figures, elements or components, serving the purpose as elements or components respectively described above, however, having a different geometrical configuration are designated the same reference numerals, however added a marking for identifying the geometrical difference. As indicated in Figs. 2a- 2d, the meltable or deterioratable ~~fibres~~ fibers may be positioned in certain zones, as in Fig. 2a, wherein a profiled pultruded body 20 includes a resin core 22 in which strips of reinforcing webs or reinforcing ~~fibres~~ fibers 24 are included together with two zones 26 including polymer or natural ~~fibres~~ fibers and providing fibers that provide a weakening of the profiled body 20 in these specific zones,

provided that the profiled body 20 ~~[[be]]~~ is heated to a temperature above the melting point or alternatively the decomposition or burning temperature of the ~~fibres~~ fibers included in the two zones. The provision of the zones may be changed for obtaining a specific bending capability as is illustrated in the embodiments 2a-2d.

- 5 Please replace the paragraph beginning at page 9, line 11 with the following rewritten paragraph:

In Fig. 2b, the profiled pultruded body 20' includes a major central zone 26' in which a large amount of polymer ~~fibres~~ fibers or similar ~~fibres~~ fibers providing weakening within the zone 26' provided the profiled pultruded body 20 be exposed to a temperature above the  
10 melting point of the polymer ~~fibres~~ fibers.

Please replace the paragraph beginning at page 9, line 16 with the following rewritten paragraph:

In Fig. 2c, a multitude of zones ~~[[26]]~~ 26'' are provided within the resin 22 of the profiled, pultruded body 20'' and at the same time, the reinforcing webs or ~~fibres~~ fibers 24 are  
15 omitted. In Fig. 2d, a further elaborated structure is shown as the profiled pultruded body 20''' includes the resin core 22 in which three weakening zones 26''' are provided. As a sandwich enclosing the resin core 22, two layers 23 are provided. The layers 23 may include a high amount of high strength, ~~[[high]]~~ high stiffness and high temperature stable ~~fibres~~ fibers, such as glass ~~fibres~~ fibers, carbon ~~fibres~~ fibers or Kevlar KEVLAR ~~fibres~~ fibers and fur-  
20 thermore, the profiled ~~pultruded~~ pultruded body 20''' includes two end profiled parts 27 enclosing the outer ends of the shallow body composed of the two sandwiching layers 23 and the central resin core 22. The ~~element~~ elements 27 may be made from resin material or alternatively may be constituted by metallic end caps which are machined to the profiled pultruded body 20''' after the completion of the pultrusion process.

- 25 Please replace the paragraph beginning at page 9, line 29 with the following rewritten paragraph:

In Fig. 3, a perspective view of a profiled pultruded body according to the present invention is shown including a glass ~~fi~~bre fiber reinforced resin 22 encircling a central weakening zone 26<sup>IV</sup>.

Please replace the paragraph beginning at page 10, line 1 with the following rewritten paragraph:

In Fig. 4 a ~~pultrusion~~ pultrusion apparatus 40 is shown comprising a receiving section 46 in which webs of ~~fibres~~ fibers reinforcing materials are introduced which webs are shown in the left-hand part of Fig. 4 and two of which are designated the reference numeral 42. In Fig. 4, the reference numeral 44 designates three supplies of high strength, high stiffness and high temperature stable ~~fibres~~ fibers such as glass ~~fibres~~ fibers, carbon ~~fibres~~ fibers or ~~Kevlar~~ KEVLAR ~~fibres~~ fibers which are also introduced into the receiving section 46 of pultrusion apparatus 40. Apart from the high strength, high stiffness and high temperature stable supplied from the supplies 44, reinforcing ~~fibres~~ fibers such as polymer ~~fibres~~ fibers or natural ~~fibres~~ fibers are further supplied to the receiving section 46 from a reservoir 43 shown in the top part of Fig. 4 which ~~fibres~~ fibers serve as reinforcing ~~fibres~~ fibers and provide high strength and high stiffness at a low temperature such as a temperature below 100° C and which ~~fibres~~ fibers are melted or deteriorated when exposed to an elevated temperature such as a temperature of 900°-1000° C. From the receiving section 46, a string 48, including the webs 42, the high strength, high stiffness and high temperature stable ~~fibres~~ fibers from the supplies 44 and further the ~~fibres~~ fibers supplied from the reservoir 43 are introduced into a resin applicator and resin heating and curing apparatus 50 communicating with a resin reservoir through a pipe 52 for the supply of resin thereto. An output die of the apparatus 50 is designated the reference numeral 54 and provides a specific ~~configured~~ configured shaping of the of a ~~pultrusion~~ pultrusion string 56 delivered from the apparatus 50 which string 56 is introduced into two puller apparatuses 58 for pulling the ~~pultrusion~~ pultrusion string from the die 54 of the apparatus 50. From the puller 58, the string 56 is delivered to a cutter 60 which separates the string 56 into distinct sections.

Please replace the paragraph beginning at page 11, line 4 with the following rewritten paragraph:

In Fig. 6, two graphs are shown, each illustrating the extension of the profiled pultruded body according to the present invention such as the body 20<sup>IV</sup> shown in Fig. 3 when exposed to a load and when not heated and when heated, respectively. The one graph designated 'no heat' represents the extension of the profiled pultruded body when not exposed to heating, and the other graph designated 'with heat' represents the extension of the profiled



pultruded body when exposed to heat such as heating to a temperature of above 500° C. As is evident from Fig. 6, the profiled pultruded body is allowed to extend to a higher degree when heated, thereby allowing the structural element including the profiled pultruded body to ~~minimise~~ minimize or eliminate temperature gradient caused bending of the structural element. When heated, the structural body has a lower shear modulus which allows the structural body to elongate more freely due to the heating thus ~~minimising~~ minimizing the temperature gradient caused bending of the structural element.

Please replace the paragraph beginning at page 11, line 18 with the following rewritten paragraph:

In Fig. ~~[[6a]]~~ 6A a detail of the diagrammatic view of Fig. 6 is shown, illustrating in greater details the first part of the two curves shown in Fig. 6. The detail of Fig. ~~[[6a]]~~ 6A shows that the 'no heat' graph is steeper than the 'with-heat' graph, and also shows that the 'no heat' graph is positioned above the 'with-heat' graph.

Please replace the paragraph beginning at page 11, line 25 with the following rewritten paragraph:

A prototype embodiment of the profiled pultruded body 20<sup>IV</sup> shown in Fig. 3 is made from the following components: The resin was phenol, the high strength, high stiffness and high temperature stable ~~fibres~~ fibers were glass ~~fibres~~ fibers, the bending zone generating ~~fibres~~ fibers were polymer ~~fibres~~ fibers of polyester. The profiles measured: 31 mm width, 50 mm height and ~~[[2,6]]~~ 2.6 mm thickness. The prototype version of the profiled pultruded body 20<sup>IV</sup> was used for the measurements illustrated in Fig. 6.